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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,607	03/01/2004	Li-Shyue Lai	67,200-1259	2041
7590 TUNG & ASSOCIATES Suite 120 838 W. Long Lake Road Bloomfield Hills, MI 48302			EXAMINER THOMAS, TONIAE M	
			ART UNIT 2822	PAPER NUMBER
			MAIL DATE 01/21/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/791,607

Applicant(s)

LAI ET AL.

Examiner

Toninae M. Thomas

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-33 and 41 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 26, 27 and 41 is/are allowed.
6) ☒ Claim(s) 28-33 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 02 September 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

1. This action is an official response to Applicant's reply received on 02 September 2008. Claims 26-33 and 41 are currently pending.

Drawings

2. The drawings received on 02 September 2008 are acceptable.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

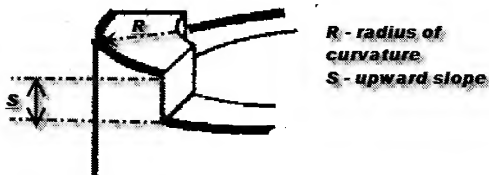
3. Claims 28-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Lowrey et al. (US 2002/0036931 A1).

The Lowrey et al. application publication discloses a phase change memory structure (see Figs. 3A-3C and accompanying text). The phase change memory structure comprises: a substrate 102 comprising a conductive area (Fig. 3A and par. 0032, lines 1-2)¹; a spacer 330 having a partially exposed sidewall region at the spacer upper portion defining a contact area, the contact area comprising an upward sloping positive radius of curvature (Fig. 3B and par. 0067). The spacer 330 comprises a

conductive material (par. 0066, lines 1-4). A spacer bottom portion at least partially overlaps the conductive area (Fig. 3B or 3C).

A portion of Figure 3B has been enlarged, in the following illustration, to show the contact area comprising an upward sloping positive radius of curvature.

Illustration



The conductive material comprises one of W, TiN, TiW, and TiAlN (par. 0062).

The phase change memory structure comprises: the spacer 330, which comprises a conductive material (par. 0066, lines 1-4); a memory element 290 on the contact area, the memory element comprising a phase changing material sensitive to temperature (Fig. 3C and par. 0066, lines 13-16); and an upper conductive electrode 300 on the memory element (Fig. 3C and par. 0068, lines 1-4).

The phase changing memory element material can comprise a chalcogenide (par. 0100 - par. 0103).

¹ The conductive area is that portion of the substrate in which the spacer makes electrical contact with the substrate.

The chalcogenide comprises a material selected from the group consisting of Ge, Te, and Sb and their alloy system (par. 0100 - par. 0103).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lowrey.

As previously explained, Lowrey discloses a spacer comprising a conductive material, wherein the conductive material comprises one of W, TiN, TiW, and TiAlN. Lowrey does not disclose that the upper conductive electrode 300 comprises a material selected from the group consisting of W, TiN, TiW, TiAl, TiAlN, and combinations thereof. However, it would have been obvious to form the upper conductive layer comprising a material selected from the group consisting of the abovementioned materials, since the spacer comprises a material selected from the very same group.

Allowable Subject Matter

5. Claims 26 and 27 are allowable over the prior art of record. Claim 41 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record does not anticipate, teach or suggest a phase change

memory structure substantially as claimed, wherein the memory structure comprises a spacer comprising a phase changing material sensitive to temperature and having a partially exposed sidewall region at the spacer upper portion defining a contact area.

Response to Arguments

6. Applicant's arguments with respect to claims 26 and 28 have been considered but are moot in view of the new ground(s) of rejection.
7. The amendment received on 02 September 2008 has overcome the rejection of claims 26 and 27 under 35 USC 112, first paragraph and the rejection of claims 30-33 under 35 USC 112, second paragraph, each rejection made of record in the previous Office action mailed on 09 July 2008. The abovementioned rejections are, therefore, withdrawn.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
9. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Toniae M. Thomas/
Examiner, Art Unit 2822

TMT
17 January 2009